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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,899	10/10/2003	Anthony K. Cheetham	1279-410/10310792	3082

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FULBRIGHT AND JAWORSKI L L P
PATENT DOCKETING 29TH FLOOR
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EXAMINER

KOSLOW, CAROL M

ART UNIT PAPER NUMBER

1755

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/683,899

Applicant(s)

CHEETHAM ET AL.

Examiner

C. Melissa Koslow

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 and 15 is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-13, 17-19, 23 and 26 is/are rejected.
- 7) ☒ Claim(s) 7, 8, 16, 20-22, 25, 27 and 28 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/10/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claims 13, 16, 23 and 24 are objected to because of the following informalities: The leading parenthesis in $\text{ZnS}:(\text{Cu}^+, \text{Al}^{3+})$ is missing. In addition, claim 13 teaches the red phosphor is $\text{BaMgAl}_{10}\text{O}_{17}:\text{Mn}^{2+}$. The "red" should be "blue". Appropriate correction is required.

Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no teaching in the specification of a light emitting device comprising the semiconductor device of claim 1, the red phosphor of claim 1 and at least one non-red phosphor. The specification only teaches a light emitting device comprising the semiconductor device of claim 1, the red phosphor of claim 1, a green phosphor and a blue phosphor. Applicant can insert the subject matter of claim 3 into the specification in order to overcome this rejection.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claim 26 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. patent 3,360,674.

This reference teaches a red phosphor having the formula $\text{YVO}_4:\text{Eu}, x\text{Bi}$, where x is 1×10^{-6} to 0.005. This formula can be rewritten as $\text{Y}_{1-x}\text{Bi}_x\text{VO}_4:\text{Eu}$, where x is 1×10^{-6} to 0.005. This formula falls within that of claim 26. The phosphor absorbs light having wavelengths in the range of about 253-365 nm. While the exact emission wavelength are not taught, the fact it is taught a red emitting phosphor means it must emit wavelengths in the claimed range, which encompasses the red light wavelengths. These wavelength ranges fall within the claimed ranges. The reference teaches the claimed phosphor.

Claims 1-3, 5, 6, 10 and 26 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. patent 6,252,254.

This reference teaches a light emitting device comprising a blue light emitting LED or laser diode, a green phosphor and a red phosphor having the formula $\text{YVO}_4:\text{Eu}, \text{Bi}$, which can be rewritten as $\text{Y}_{1-x}\text{Bi}_x\text{VO}_4:\text{Eu}$, where $0 < x < 1$. This formula falls within that of claims 5, 6 and 26. The blue emitting LEDs emit light having a wavelength in the range of 420-470 nm, which falls within the claimed range. This phosphor is excited or absorbs light emitted by the LED, or 420-470 nm, and a peak emission of about 620 nm. These wavelength ranges fall within the claimed ranges. The reference teaches the claimed phosphor and device.

Claims 1-5, 9-12 and 17-19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. patent 6,084,250.

This reference teaches a white light emitting device comprising a GaN LED, which emits light having a wavelength of 300-370 nm, $\text{BaMgAl}_{10}\text{O}_{17}:\text{Mn}^{2+}$ as a blue phosphor, a green

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phosphor and a $\text{YVO}_4:\text{Eu}$ red phosphor, which falls within the formula of claims 5 and 19. The $\text{YVO}_4:\text{Eu}$ red phosphor is excited or absorbs light having a wavelength of 370 nm and a peak emission of 620 nm. These wavelength ranges fall within the claimed ranges. The reference teaches the claimed phosphor, phosphor combination and device.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. patent 6,084,250 in view of U.S. patent 6,278,135.

As stated above, U. S. patent 6,084,250 teaches the claimed device and phosphor combination. It does not teach the green phosphor can be $\text{ZnS}:(\text{Cu}^+, \text{Al}^{3+})$, but it does teach that any green phosphor which is excited by ultraviolet radiation of about 370 nm which is emitted by a LED can be used in the taught device. U.S. patent 6,278,135 teaches $\text{ZnS}:(\text{Cu}^+, \text{Al}^{3+})$ is such as green phosphor. Therefore one of ordinary skill in the art would have found it obvious to use to $\text{ZnS}:(\text{Cu}^+, \text{Al}^{3+})$ as the green phosphor in the device of U. S. patent 6,084,250. The references suggest the claimed device and phosphor combination.

Claims 14 and 15 are allowed.

Claims 16 and 24 would be allowable if rewritten or amended to overcome the objection set forth in this Office action.

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Claims 7, 8, 20, 21, 22, 25, 27 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching or suggestion in the cited art of record of a phosphor having the formula $\text{Bi}_x\text{Ln}_{1-x}\text{VO}_4\text{:A}$, where x is 0.05-0.5, Ln is Y, La or Gd and A is Eu, Sm, Pr or any combination thereof, with or without Tb as a co-dopant. There is no teaching or suggestion of the claimed device comprising of a phosphor having the formula $\text{Bi}_x\text{Ln}_{1-x}\text{VO}_4\text{:Tb,A}$, where x is 0-1, Ln is Y, La or Gd and A is Eu, Sm, Pr or any combination thereof. There is no teaching or suggestion in the cited art of record of a phosphor having the formula $\text{Bi}_x\text{Ln}_{1-x}\text{VO}_4\text{:Tb,A}$, where $0 < x < 1$ Ln is Y, La or Gd and A is Eu, Sm, Pr or any combination thereof. There is no teaching or suggestion of a white light emitting phosphor combination comprising a green phosphor, a blue phosphor and a red phosphor having the formula $\text{Bi}_x\text{Ln}_{1-x}\text{VO}_4\text{:A}$, where $0 < x < 1$, Ln is Y, La or Gd and A is Eu, Sm, Pr or any combination thereof, with or without Tb as a co-dopant or a red phosphor having the formula $\text{Bi}_x\text{Ln}_{1-x}\text{VO}_4\text{:Tb,A}$, where x is 0-1, Ln is Y, La or Gd and A is Eu, Sm, Pr or any combination thereof.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Bell, can be reached at (571) 272-1362.

The fax number for all official communications is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cmk

October 25, 2004



C. Melissa Koslow
Primary Examiner
Tech. Center 1700